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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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ROSENBERG, KLEIN & LEE
3458 ELLICOTT CENTER DRIVE-SUITE 101
ELLICOTT CITY MD 21043

EXAMINER
MCKINNON, T

ART UNIT	PAPER NUMBER
3743	

DATE MAILED:

2
07/09/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/747,999

Applicant(s)

LIU ET AL.

Examiner

Terrell L Mckinnon

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3743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 13-20, and 22 is/are rejected.
- 7) ☒ Claim(s) 11, 12, 21, 23, and 24 is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Godfrey H. Lee (GB 2,088,544).

Godfrey discloses a heat exchanger comprising:

- a plurality of fins (60) spaced from each other in a parallel arrangement;
- a plurality of heat transfer tubes (58) extending through the fins;
- a vortex generator (page 2, lines 40-45) comprising a plurality of protuberance ribs formed on the fins having air inlets, outlets, and through channels;
- the vortex generator comprises two front and two rear protuberance ribs;
- co-rotating or counter rotating air flow (page 2, lines 97-104);
- protuberance ribs shaped as an arc having a curved surface;
- protuberance ribs formed in a curved shaped along the extension of the fins (page 2, lines 48-53); and

- the use of optimizing the number of sets of vortex generator means as well as the configuration for a given heat transfer arrangement.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 7-8, are rejected under 35 U.S.C. 103(a) as being unpatentable over Godfrey H. Lee (GB 2,088,544) in view of Hisashi Aiki (JP 62-266391)

Godfrey H. Lee discloses all of the claimed limitations except for protuberance ribs having a vertical wall connected to a horizontal wall, and protuberance ribs having a sloped wall connected to a horizontal top wall.

5. Hisashi Aiki discloses a heat exchanger comprising:

- protuberance ribs having a sloped wall connected to a horizontal top wall.

Regarding claim 7, it is very well known to one skilled in the art to have protuberance ribs on a fin wherein a vertical wall connected to a horizontal wall. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Hisashi Aiki's protuberance ribs to have a vertical wall connected to a horizontal top wall. Doing so would provide an alternate means of arranging the fins to provide efficient heat dissipation.

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6. Given the teachings of Hisashi Aiki, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the fin of Godfrey H. Lee with protuberance ribs shaped as an arc having a curved surface. Protuberance ribs having a vertical wall connected to a horizontal wall, and protuberance ribs having a sloped wall connected to a horizontal top wall. Doing so would improve air flow and heat dissipation of the heat exchanger.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Godfrey H. Lee (GB 2,088,544) in view of Hisashi Aiki (JP 62-266391) as applied to claims above, and further in view of Yoshiyuki Tsuda et al. (JP 36-1006590).

Godfrey H. Lee discloses all of the claimed limitations except for protuberance ribs having two sloped walls connected together to form a triangular shape.

Yoshiyuki Tsuda teaches protuberance ribs having two sloped walls connected together to form a triangular shape.

8. Given the teachings of Yoshiyuki Tsuda, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the fin of Godfrey H. Lee with protuberance ribs having two sloped walls connected together to form a triangular shape. Doing so would enhance the heat transfer performance by reducing the dead air space.

9. Claims 13-18, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Godfrey H. Lee (GB 2,088,544) in view of Yoshiyuki Tsuda et al. (JP 61-006590).

Godfrey H. Lee discloses a heat exchanger comprising:

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- a plurality of fins (60) spaced from each other in a parallel arrangement;
- a plurality of heat transfer tubes (58) extending through the fins;
- a vortex generator (page 2, lines 40-45) comprising a plurality of protuberance ribs formed on the fins having air inlets, outlets, and through channels;
- co-rotating or counter rotating air flow (page 2, lines 97-104);
- protuberance ribs shaped as an arc having a curved surface;
- protuberance ribs formed in a curved shaped along the extension of the fins (page 2, lines 48-53).

Godfrey fails to disclose a plurality of inner protuberance ribs and a plurality of outer protuberance ribs corresponding to the inner ribs and centralized with a heat transfer tube. Two front protuberance ribs beside the air flow inlet and two rear protuberance ribs beside the air flow outlet. The inner and outer ribs being formed as a curved shape along the extension of the fin, and the inner and outer ribs having two sloped walls connected together to form a triangular shape.

10. Yoshiyuki Tsuda et al discloses a heat exchanger comprising:

- a plurality of inner protuberance ribs and corresponding outer protuberance centralized with a heat transfer tube;
- two front protuberance ribs beside the air flow inlet and two rear protuberance ribs beside the air flow outlet;

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- inner and outer protuberance ribs being formed in a curved shape along the extension of the fin; and
- inner and outer ribs having two sloped walls connected together to form a triangular shape.

Regarding claim 16, Godfrey fails to disclose the vortex generator means to have the inner and outer ribs projecting in opposite directions. However Godfrey does disclose the use of optimizing the number of sets of vortex generator means as well as the configuration for a given heat transfer arrangement (page 3, lines 45-53). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention based on Godfrey's disclosure of optimizing the vortex generator means to have fins comprising inner and outer ribs projecting in opposite directions for the purpose of optimizing heat transfer for a given application.

11. Given the teachings of Yoshiyuki Tsuda et al, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Godfrey's heat exchanger with a plurality of inner protuberance ribs and outer corresponding protuberance ribs centralized with a heat transfer tube. Two front protuberance ribs beside the airflow inlet and two rear protuberance ribs beside the airflow outlet. The inner and outer protuberance ribs being formed as a curved shape along the extension of the fin. The inner and outer protuberance ribs having two sloped walls connected together to form a triangular shape, and the vortex generator means having fins comprising inner and outer protuberance ribs projecting in opposite directions. Doing so would facilitate turbulent airflow to improve heat dissipation.

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12. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Godfrey H. Lee (GB 2,088,544) in view of Yoshiyuki Tsuda et al. (JP 61-006590) as applied to claims above, and further in view of Hisashi Aiki (JP 62-266391).

Godfrey discloses all of the claimed limitations except for the inner and outer protuberance ribs having a sloped wall connected to a horizontal top wall, and the inner and outer protuberance ribs having a vertical wall connected to a horizontal top wall.

13. Hisashi Aiki discloses a heat exchanger comprising:

- protuberance ribs having a sloped wall connected to a horizontal top wall;

Regarding claim 19, it is very well known to one skilled in the art to have protuberance ribs on a fin wherein a vertical wall connected to a horizontal wall.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Hisashi Aiki's protuberance ribs to have a vertical wall connected to a horizontal top wall. Doing so would provide an alternate means of arranging the fins to provide efficient heat dissipation.

14. Given the teachings of Hisashi Aiki, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify Godfrey's heat exchanger with inner and outer protuberance ribs having a sloped wall connected to a horizontal top wall. Also, inner and outer protuberance ribs having a vertical wall connected to a horizontal top wall. Doing so would improve air flow and heat dissipation of the heat exchanger.

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Allowable Subject Matter

15. Claims 11, 12, 21, 23, and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references are cited for disclosing related limitations of the applicant's disclosure. Yoshiyuki Tsuda, Makoto Obata, Blystone et al., Park et al., and Kim.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terrell L Mckinnon whose telephone number is 703-305-0059. The examiner can normally be reached on Monday -Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ira Lazarus can be reached on 305-1935. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7764 for regular communications and 703-308-7764 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1148.


Ira S. Lazarus
Supervisory Patent Examiner
Group 3700

TM
June 29, 2001

Attachment for PTO-948 (Rev. 03/01, or earlier)
6/18/01

The below text replaces the pre-printed text under the heading, "Information on How to Effect Drawing Changes," on the back of the PTO-948 (Rev. 03/01, or earlier) form.

INFORMATION ON HOW TO EFFECT DRAWING CHANGES

1. Correction of Informalities -- 37 CFR 1.85

New corrected drawings must be filed with the changes incorporated therein. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin. If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the Notice of Allowability. Extensions of time may **NOT** be obtained under the provisions of 37 CFR 1.136(a) or (b) for filing the corrected drawings after the mailing of a Notice of Allowability. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

2. Corrections other than Informalities Noted by Draftsperson on form PTO-948.

All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, a highlighted (preferably red ink) sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made other than correction of informalities, unless the examiner has approved the proposed changes.

Timing of Corrections

Applicant is required to submit the drawing corrections within the time period set in the attached Office communication. See 37 CFR 1.85(a).

Failure to take corrective action within the set period will result in **ABANDONMENT** of the application.